



73607

## SEQUENCE LISTING

&lt;110&gt; MASLE, JOSETTE

FARQUHAR, GRAHAM DOUGLAS

GILMORE, SCOTT ROBERT

&lt;120&gt; METHOD OF PRODUCING PLANTS HAVING ENHANCED TRANSPIRATION EFFICIENCY AND PLANTS PRODUCED THEREFROM

&lt;130&gt; 73607/JPW/JRM

&lt;150&gt; 10/519,135

&lt;151&gt; 2003-07-02

&lt;160&gt; 65

&lt;170&gt; PatentIn version 3.2

&lt;210&gt; 1

&lt;211&gt; 3176

&lt;212&gt; DNA

&lt;213&gt; Arabidopsis thaliana ERECTA allele

&lt;400&gt; 1

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 Page 3

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Leu Ser Ser Asn Asn Phe Lys Gly Asn Ile Pro Ser Glu Leu Gly His  
Page 9

420

425

430

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Gln Ser Ile Asp Leu Gln Gly Asn Lys Leu Gly Gly Gln Ile Pro Asp  
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Tyr Leu Gln Leu Asn Asp Asn Glu Leu Val Gly Lys Ile Pro Pro Glu  
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Pro Ala Lys Val Gln Glu Gly Glu Glu Arg Arg Glu Ser His Ser Ser  
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Asp Thr Thr Thr Pro Gln Trp Phe Val Gln Phe Arg Glu Asp Ile Ser  
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Lys Ser Ser Leu  
930

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&lt;210&gt; 10

&lt;211&gt; 966

&lt;212&gt; PRT

&lt;213&gt; Arabidopsis thaliana ERECTA homolog

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35 40 45

Asp Trp Asp Asp Val His Asn Ser Asp Leu Cys Ser Trp Arg Gly Val  
50 55 60

Phe Cys Asp Asn Val Ser Tyr Ser Val Val Ser Leu Asn Leu Ser Ser  
65 70 75 80

Leu Asn Leu Gly Gly Glu Ile Ser Pro Ala Ile Gly Asp Leu Arg Asn  
85 90 95

Leu Gln Ser Ile Asp Leu Gln Gly Asn Lys Leu Ala Gly Gln Ile Pro  
100 105 110

Asp Glu Ile Gly Asn Cys Ala Ser Leu Val Tyr Leu Asp Leu Ser Glu  
115 120 125

Asn Leu Leu Tyr Gly Asp Ile Pro Phe Ser Ile Ser Lys Leu Lys Gln  
130 135 140

Leu Glu Thr Leu Asn Leu Lys Asn Asn Gln Leu Thr Gly Pro Val Pro  
145 150 155 160

Ala Thr Leu Thr Gln Ile Pro Asn Leu Lys Arg Leu Asp Leu Ala Gly  
165 170 175

Asn His Leu Thr Gly Glu Ile Ser Arg Leu Leu Tyr Trp Asn Glu Val  
180 185 190

Leu Gln Tyr Leu Gly Leu Arg Gly Asn Met Leu Thr Gly Thr Leu Ser  
195 200 205

Ser Asp Met Cys Gln Leu Thr Gly Leu Trp Tyr Phe Asp Val Arg Gly  
210 215 220

Asn Asn Leu Thr Gly Thr Ile Pro Glu Ser Ile Gly Asn Cys Thr Ser  
225 230 235 240

Phe Gln Ile Leu Asp Ile Ser Tyr Asn Gln Ile Thr Gly Glu Ile Pro  
245 250 255



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Tyr Asn Ile Gly Phe Leu Gln Val Ala Thr Leu Ser Leu Gln Gly Asn  
260 265 270

Arg Leu Thr Gly Arg Ile Pro Glu Val Ile Gly Leu Met Gln Ala Leu  
275 280 285

Ala Val Leu Asp Leu Ser Asp Asn Glu Leu Val Gly Pro Ile Pro Pro  
290 295 300

Ile Leu Gly Asn Leu Ser Phe Thr Gly Lys Leu Tyr Leu His Gly Asn  
305 310 315 320

Met Leu Thr Gly Pro Ile Pro Ser Glu Leu Gly Asn Met Ser Arg Leu  
325 330 335

Ser Tyr Leu Gln Leu Asn Asp Asn Lys Leu Val Gly Thr Ile Pro Pro  
340 345 350

Glu Leu Gly Lys Leu Glu Gln Leu Phe Glu Leu Asn Leu Ala Asn Asn  
355 360 365

Arg Leu Val Gly Pro Ile Pro Ser Asn Ile Ser Ser Cys Ala Ala Leu  
370 375 380

Asn Gln Phe Asn Val His Gly Asn Leu Leu Ser Gly Ser Ile Pro Leu  
385 390 395 400

Ala Phe Arg Asn Leu Gly Ser Leu Thr Tyr Leu Asn Leu Ser Ser Asn  
405 410 415

Asn Phe Lys Gly Lys Ile Pro Val Glu Leu Gly His Ile Ile Asn Leu  
420 425 430

Asp Lys Leu Asp Leu Ser Gly Asn Asn Phe Ser Gly Ser Ile Pro Leu  
435 440 445

Thr Leu Gly Asp Leu Glu His Leu Leu Ile Leu Asn Leu Ser Arg Asn  
450 455 460

His Leu Ser Gly Gln Leu Pro Ala Glu Phe Gly Asn Leu Arg Ser Ile  
465 470 475 480

Gln Met Ile Asp Val Ser Phe Asn Leu Leu Ser Gly Val Ile Pro Thr  
485 490 495

Glu Leu Gly Gln Leu Gln Asn Leu Asn Ser Leu Ile Leu Asn Asn Asn  
500 505 510

Lys Leu His Gly Lys Ile Pro Asp Gln Leu Thr Asn Cys Phe Thr Leu  
515 520 525

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Val Asn Leu Asn Val Ser Phe Asn Asn Leu Ser Gly Ile Val Pro Pro  
530 535 540

Met Lys Asn Phe Ser Arg Phe Ala Pro Ala Ser Phe Val Gly Asn Pro  
545 550 555 560

Tyr Leu Cys Gly Asn Trp Val Gly Ser Ile Cys Gly Pro Leu Pro Lys  
565 570 575

Ser Arg Val Phe Ser Arg Gly Ala Leu Ile Cys Ile Val Leu Gly Val  
580 585 590

Ile Thr Leu Leu Cys Met Ile Phe Leu Ala Val Tyr Lys Ser Met Gln  
595 600 605

Gln Lys Lys Ile Leu Gln Gly Ser Ser Lys Gln Ala Glu Gly Leu Thr  
610 615 620

Lys Leu Val Ile Leu His Met Asp Met Ala Ile His Thr Phe Asp Asp  
625 630 635 640

Ile Met Arg Val Thr Glu Asn Leu Asn Glu Lys Phe Ile Ile Gly Tyr  
645 650 655

Gly Ala Ser Ser Thr Val Tyr Lys Cys Ala Leu Lys Ser Ser Arg Pro  
660 665 670

Ile Ala Ile Lys Arg Leu Tyr Asn Gln Tyr Pro His Asn Leu Arg Glu  
675 680 685

Phe Glu Thr Glu Leu Glu Thr Ile Gly Ser Ile Arg His Arg Asn Ile  
690 695 700

Val Ser Leu His Gly Tyr Ala Leu Ser Pro Thr Gly Asn Leu Leu Phe  
705 710 715 720

Tyr Asp Tyr Met Glu Asn Gly Ser Leu Trp Asp Leu Leu His Gly Ser  
725 730 735

Leu Lys Lys Val Lys Leu Asp Trp Glu Thr Arg Leu Lys Ile Ala Val  
740 745 750

Gly Ala Ala Gln Gly Leu Ala Tyr Leu His His Asp Cys Thr Pro Arg  
755 760 765

Ile Ile His Arg Asp Ile Lys Ser Ser Asn Ile Leu Leu Asp Glu Asn  
770 775 780

Phe Glu Ala His Leu Ser Asp Phe Gly Ile Ala Lys Ser Ile Pro Ala  
785 790 795 800

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Ser Lys Thr His Ala Ser Thr Tyr Val Leu Gly Thr Ile Gly Tyr Ile  
805 810 815

Asp Pro Glu Tyr Ala Arg Thr Ser Arg Ile Asn Glu Lys Ser Asp Ile  
820 825 830

Tyr Ser Phe Gly Ile Val Leu Leu Glu Leu Leu Thr Gly Lys Lys Ala  
835 840 845

Val Asp Asn Glu Ala Asn Leu His Gln Leu Ile Leu Ser Lys Ala Asp  
850 855 860

Asp Asn Thr Val Met Glu Ala Val Asp Pro Glu Val Thr Val Thr Cys  
865 870 875 880

Met Asp Leu Gly His Ile Arg Lys Thr Phe Gln Leu Ala Leu Leu Cys  
885 890 895

Thr Lys Arg Asn Pro Leu Glu Arg Pro Thr Met Leu Glu Val Ser Arg  
900 905 910

Val Leu Leu Ser Leu Val Pro Ser Leu Gln Val Ala Lys Lys Leu Pro  
915 920 925

Ser Leu Asp His Ser Thr Lys Lys Leu Gln Gln Glu Asn Glu Val Arg  
930 935 940

Asn Pro Asp Ala Glu Ala Ser Gln Trp Phe Val Gln Phe Arg Glu Val  
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Ile Ser Lys Ser Ser Ile  
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ctacactggc aaactatatatt tgcattggcaa taaacttact ggtgaagtac ccccggaact 420  
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gctactattg gtgatcttga gcatcttctt caactaaatt tgagcaaaaa ccatcttagc	180
gggtcagtgc ctgctgagtt cggaaacttg agaagcatcc aagtaattga tttatccaac	240
aacgccatgt ctgggttatct ccctgaagaa ctaggccaac ttcagaacct tgatagtttg	300
attcttaaca acaatatattt ggtcggggag atccctgctc agttggctaa ctgcttc	357

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 <212> DNA  
 <213> partial wheat ERECTA

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agttctgaaa cttgagaagc atccaagtaa ttgatttatc caacaacgcc atgtctggtt	180
atctccctga agaactacgc caacttcaga atcttgatag tttgatgctt aacaacaata	240
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tgccatataa caac	314

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 <211> 549  
 <212> DNA  
 <213> partial wheat ERECTA

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agatagtact cctcc	615

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atataaaaca aagcgaccac agccacctat caaagcatct gataaaccag tgcaaggacc	180
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taaatgtgtg ctcaagagtg gcaaggccat tgctgtgaag cggctctaca gccaatacaa	360
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catggaaaat ggttccttgt gggatcttct ccacgggtcca tcaaagaagg tgaaacttga	540
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<210> 19  
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ggatcatatca tcaatttggga cactctggat ctttcctaca atgaactctc tggaccagtt	180
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aacaacgcca tgtctgggta tctccctgaa gaactaggcc aacttcagaa ccttgatagt	360

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aactttctca agttccccgg ggaaagcttc ttgggaaatc cgatgctgag cggtcactgc	540
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<210> 20  
 <211> 448  
 <212> PRT  
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<400> 20

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 20 25 30

Lys Gly His Ile Pro Ser Glu Leu Gly His Ile Ile Asn Leu Asp Thr  
 35 40 45

Leu Asp Leu Ser Tyr Asn Glu Leu Ser Gly Pro Val Pro Ala Thr Ile  
 50 55 60

Gly Asp Leu Glu His Leu Leu Gln Leu Asn Leu Ser Lys Asn His Leu  
 65 70 75 80

Ser Gly Ser Val Pro Ala Glu Phe Gly Asn Leu Arg Ser Ile Gln Val  
 85 90 95

Ile Asp Leu Ser Asn Asn Ala Met Ser Gly Tyr Leu Pro Glu Glu Leu

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100	105	110
Gly Gln Leu Gln Asn Leu Asp Ser Leu Ile Leu Asn Asn Asn Ile Leu		
115	120	125
Val Gly Glu Ile Pro Ala Gln Leu Ala Asn Cys Phe Ser Leu Asn Ile		
130	135	140
Leu Asn Leu Ser His Asn Asn Phe Ser Gly His Val Pro Phe Ala Lys		
145	150	155
Asn Phe Ser Lys Phe Pro Gly Glu Ser Phe Leu Gly Asn Pro Met Leu		
165	170	175
Ser Val His Cys Lys Asp Ser Ser Cys Gly Asn Ser His Gly Ser Lys		
180	185	190
Val Asn Thr Arg Thr Ala Ile Ala Cys Ile Ile Ser Gly Phe Val Ile		
195	200	205
Leu Leu Cys Val Leu Leu Leu Ala Ile Tyr Lys Thr Lys Arg Pro Gln		
210	215	220
Pro Pro Ile Lys Ala Ser Asp Lys Pro Gly Gln Gly Pro Pro Lys Ile		
225	230	235
Val Leu Leu Gln Met Asp Met Ala Ile His Thr Tyr Asp Asp Ile Met		
245	250	255
Arg Leu Thr Glu Asn Leu Ser Glu Lys Tyr Ile Ile Gly Tyr Gly Ala		
260	265	270
Ser Ser Thr Val Tyr Lys Cys Val Leu Lys Ser Gly Lys Ala Ile Ala		
275	280	285
Val Lys Arg Leu Tyr Ser Gln Tyr Asn His Gly Ala Arg Glu Phe Glu		
290	295	300
Thr Glu Leu Glu Thr Val Gly Ser Ile Arg His Arg Asn Leu Val Ser		
305	310	315
Leu His Gly Phe Ser Leu Ser Pro Asn Gly Asn Leu Leu Phe Tyr Asp		
325	330	335
Tyr Met Glu Asn Gly Ser Leu Trp Asp Leu Leu His Gly Pro Ser Lys		
340	345	350
Lys Val Lys Leu Asp Trp Asp Thr Arg Leu Arg Ile Ala Val Gly Ala		
355	360	365



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Ala Gln Gly Leu Ala Tyr Leu His His Asp Cys Asn Pro Arg Ile Val  
370 375 380

His Arg Asp Val Lys Ser Ser Asn Ile Leu Leu Asp Glu His Phe Glu  
385 390 395 400

Ala His Leu Ser Asp Phe Gly Ile Ala Lys Cys Val Pro Ala Ala Lys  
405 410 415

Thr His Ala Ser Thr Tyr Val Leu Gly Thr Ile Gly Tyr Ile Asp Pro  
420 425 430

Glu Tyr Ala Arg Thr Ser Gln Leu Asn Glu Lys Ser Asp Val Tyr Ser  
435 440 445

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tacggggcat caagtacagt ttataaatgt gttctaaaga attgcaaacc agtggcaata 360  
aaaaagctgt atgccacta ccctgcagag ccttaaggaa ttgaaactg agctcgagac 420  
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gttggaacc tcctctttta tgattatatg gagagtggca gcttatggga tgttttacat 540  
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aatctccatc acttgatcct atcgaagacg gcgagcaacg aggtcatgga gacggtggac 960  
cccgacgtgg gagacacctg caaggacctg ggcgaggtga agaagctgtt ccagctggcg 1020  
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gcacgcgcac caccagctgc cgccgcagcc gtcgccgccc gcctacgtcg acgagtacgt 1200  
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gctgttcctc aag 1273

<210> 22  
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 <212> DNA  
 <213> partial maize ERECTA

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 <212> DNA  
 <213> partial maize ERECTA

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 <222> (529)..(529)  
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 cgtcccacaa aatgtcagtc aaactactcc ctgcaatcgg cctcactcaa ggcgcctcac 180  
 cgaacgtcta cgtcttcccc tacaccatgt tctgcgagat ggcctcgccg aacttgagga 240  
 acagctcggc gtccgaggtg ctggacgagt tggcgcagga gagggcgccg gtgccccgca 300  
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 cgtgcgctt ctgctgctgc tgctgcggct gcggcgggcg ctccgggttc accaggcagt 420  
 caaggacgcg caccacctcg tgcctcgtcg gccgggtccga gggctgccgc ttggtgcaga 480  
 ggagcgccag ctggaacagc ttcttcacct cgcccagggtc cttgcaggng tctcccacgt 540  
 cgggggtccac cgtctccatg acctcgttgc tcgccgtctt cgataggatc aaggatgga 599

<210> 24  
 <211> 436  
 <212> DNA  
 <213> partial maize ERECTA

<400> 24  
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 aatgtcagcc aaactactcc ctgcaatcgg cctcactcaa ggcgcctcac cgaacgtcta 180  
 cgtcttcccc tacaccatgt tctgcgagat ggcctcgccg aacttgagga acagctcggc 240  
 gtccgaggtg ctggacgagt tggcgcagga gagggcgccg gtgccccgca ggctgacgta 300  
 ctcgtcgacg taggccggcg gggacggctg cggcggcagc tgggtggtgcg cgtgcgctt 360  
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caccacctcg ggcatac

436

<210> 25  
 <211> 509  
 <212> DNA  
 <213> partial maize ERECTA

<400> 25  
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 gcgcctcacc gaacgtctac gtcttcccct acaccatggt ctgagagatg gcctcgccga 240  
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 ggtggtgcgc gtgagccttc tgctgctgct gctgcggctg cggcggcggc tccgggttca 420  
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<210> 26  
 <211> 318  
 <212> DNA  
 <213> partial maize ERECTA

<400> 26  
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 accctagcta ctgagtccca tgtaaatctc ctgcgctgcg tcccacaaaa tgcagtcaa 180  
 actactcccc ctgcaatcgg cctcaactcaa ggcgcctcac cgaacgtcta cgtcttcccc 240  
 tacacatgt tctgcgagat ggcctcgccg aacttgagga acagctcggc gtccgaggtg 300  
 ctggacgagt tggcgcag 318

<210> 27  
 <211> 103  
 <212> DNA  
 <213> partial maize ERECTA

<400> 27  
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 catgtctttg atgatataat gaggatgact gagaacttga gtg 103

<210> 28  
 <211> 458  
 <212> DNA  
 <213> partial maize ERECTA

<400> 28  
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cttacagact tcggcatcgc taagagctta tgtgtctcga agactcacac gtcaacctac	120
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 <211> 593  
 <212> DNA  
 <213> partial maize ERECTA

<400> 29	
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gcgtcccaca aaatgtcagt caaactactc cctgcaatcg gcctcatttt tttgttgctc	180
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aggaacagct cggcgctccga ggtgctggac gagttggcgc aggaaagggc gccggtgccc	300
cgcaggctga cgtactcgtc gacgtaggcc ggcggcgacg gctgcggcgg cagctggtgg	360
tgcgcgtgag ccttctgctg ctgctgctgc ggctgcggcg gcggctccgg gttcaccagg	420
cagtcaagga cgcgcaccac ctctgctatc gtcggccggt ccgagggctg ccgcttggtg	480
cagaggagcg ccagctggaa cagcttcttc acctcgccca ggtccttgca ggtgtctccc	540
acgtcggggt ccaccggctc catgacctcg ttgctcgccg tcttcgatag gat	593

<210> 30  
 <211> 206  
 <212> DNA  
 <213> partial maize ERECTA

<400> 30	
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agtaagttag accacaaaga aaaatgggga ggggggataa agaagaggaa gaagctccgc	120
tgctcttgag tcacatgact ttttttacag ctaacaacac cctagctact ggtcccatg	180
ttaatctcct gcgctgctgc ccacaa	206

<210> 31  
 <211> 534  
 <212> DNA  
 <213> partial maize ERECTA

<400> 31	
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caaagaaaaa tggggagggg ggataaagaa gaggaagaag ctccgctgct cttgcgtcac	120

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atgacttttt	ttacagctaa	caacacccta	gctactgagt	cccatgttaa	tctcctgcgc	180
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tcaccgaacg	tctacgtctt	cccctacacc	atgttctgcg	agatggcctc	gccgaacttg	300
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cagtcaagga	cgcgcaccac	ctcgtgcatc	gtcggccggt	ccgagggctg	ccgc	534

<210> 32  
 <211> 527  
 <212> DNA  
 <213> partial maize ERECTA

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gagtcccatg	ttaatctcct gcgctgcgtc ccacaaaatg tcagtcaaac tactccctgc 240
aatcggcctc	actcaaggcg cctcaccgaa cgtctacgtc ttcccctaca ccatgttctg 300
cgagatggcc	tcgccgaact tgaggaacag ctcggcgtcc gaggtgctgg acgagttggc 360
gcaggaaagg	gcgccggtgc cccgcaggct gacgtactcg tcgacgtagg ccggcggcga 420
cggctgcggc	ggcagctggt ggtgcgcgtg cgcttctgc tgctgctgct gcggctgcgg 480
cggcggtcc	gggttcacca ggcagtcaag gacgcgcacc acctcgt 527

<210> 33  
 <211> 412  
 <212> DNA  
 <213> partial maize ERECTA

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cgccggggcc	ccgcaggctg acgtactcgt cgacgtaggc cggcggcgac ggctgcggcg 300
gcagctgggg	gtgcgcgtgc gccttctgct gctgctgctg cggttgccgg ggcggctccg 360
ggttcaccag	gcagtcaagg acgcgcacca cctcgggcat cgtcggccgg tc 412

<210> 34  
 <211> 533  
 <212> DNA  
 <213> partial maize ERECTA

<400> 34

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cgttgcgta catgactttt tacagctaac aacaccctag ctactgagtc ccatgttaat	180
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aggcgcctca ccgaacgtct acgtcttccc ctacaccatg ttctgcgaga tggcctcgcc	300
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ggtgccccgc aggctgacgt actcgtcgac gtaggccggc ggcgacggct gcggcggcag	420
ctggtggtgc gcgtgcgct tctgctgctg ctgctgcggc tgcggcggcg gctccgggtt	480
caccaggcag tcaaggacgc gcaccacctc gtgcatcgtc ggccgggtccg agg	533

<210> 35  
 <211> 191  
 <212> DNA  
 <213> partial maize ERECTA

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aagaagctcc gctgctcttg cgttgcgta catgactttt tacagctaaa caacacccta	120
gctactgagt cccatggtaa tctcctgctg tgcgtccac aaaatgtcag tcaaactact	180
ccctgcaatc g	191

<210> 36  
 <211> 683  
 <212> DNA  
 <213> partial maize ERECTA

<400> 36	
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gtgcagctca aggcctcgct taccttcacc atgactgcag cccacgaata attcaccggg	180
acgtaaaatc aaagaatata ctctcgaca aagattatga ggcgcatctt acagacttcg	240
gcatcgctaa gagcttatgt gtctcgaaga ctcacacgtc aacctacgtc atgggcacta	300
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cgctcctctg caccaagcgg cagccctcgg accggccgac gatgcacgag gtggtgcgcg	600
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cgacgcgca ccaccagctg ccg	683

<210> 37  
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<212> DNA  
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 gtagacgttc 610

<210> 38  
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 <212> DNA  
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<220>  
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 <222> (138)..(138)  
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 cggggcatca agtactgntt ataatgtgt tctaaagaat tgcaaaccag tggcaataaa 180  
 aaagctgtat gccactacc ctgagagc 208

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## 73607

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gagtacgtca gcctgcgggg caccggcgcc ctctcctgcg ccaactcgtc cagcacctcg	600
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<210> 41  
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 <212> DNA  
 <213> partial maize ERECTA

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tgctcactgg cttgcttaca gtggcatctt taaaagcagg tggatgggtgt ggcctgcata	180
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<210> 42  
 <211> 556  
 <212> DNA  
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<210> 44  
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 <213> maize ERECTA

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Thr Ile Pro Arg Ser Leu Arg Lys Leu Glu Ser Met Thr Tyr Leu Asn  
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Leu Ser Ser Asn Phe Ile Ser Gly Ser Ile Pro Ile Glu Leu Ser Arg  
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Ser Ile Lys His Arg Asn Leu Val Ser Leu Gln Gly Tyr Ser Leu Ser  
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Pro Val Gly Asn Leu Leu Phe Tyr Ala Tyr Met Glu Ser Gly Ser Leu  
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Val Met Gly Thr Ile Gly Tyr Ile Asp Pro Glu Tyr Ala Arg Thr Ser  
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Arg Leu Asn Glu Lys Ser Asp Val Tyr Ser Tyr Gly Ile Val Leu Leu  
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